ORIGINAL

ORIG NAL

ShawPittman LLP

A Limited Liability Partnership Including Professional Corporations

EX PARTE OR LATE FILED

November 18,2002

RECEIVED

NOV 18 2002

FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF THE SECRETARY

Via Hand Delivery
Ms. Marlene H. Dortch
Secretary
Federal Communications Commission
445 12th Street, S.W.
Washington, D.C. 20554

Re: ***Ex Parte*** **Presentation**
IB Docket No. ***01-185, Flexibility for Delivery of Communications by Mobile Satellite Service Providers in the 2 GHz Band, the L-Band, and the 1.6/2.4 GHz band;***
File No. SAT-ASG-20010302-00017 et al., ***Application of Mobile Satellite Ventures Subsidiary LLC to Launch and Operate a Next-Generation Satellite System***

Dear Ms. Dortch:

On November 14,2002, in response to a request from Commission staff, Mobile Satellite Ventures Subsidiary LLC ("MSV") provided the following information regarding in-building penetration margins. MSV hereby tiles this information for inclusion in the record of the above-captioned proceedings.

Very truly yours,

David S. Konczal

0+4

"Peter Karabinis" <pkarabinis@msvlp.com>

11/14/2002 02 54 PM

To <plocke@fcc.gov>
Subject. In-Building Penetration Margin

Paul, below please find statements that I have received from Ericsson regarding the subject matter. Also, please see the attached TELECEL presentation (also sent to MSV by Ericsson). The TELECEL presentation was presented at an IEEE-sponsored conference "Measuring and Optimizing GSM Network Performance", April 25, 2001, Geneva, Switzerland. Page 10 of the TELECEL presentation suggests 20 dB of link margin be allocated to in-building penetration. Ericsson clearly states that their design methodology uses 18 dB.

Peter.

_____Original Message-----
From: Marc Brattstrom (EUS) [mailto:Marc.Brattstrom@aml.erlcsson.sel
Sent: Friday, September 07, 2001 5:45 PM
To: 'Peter Karabinis'
Cc: **Dick** Evans; Gary Churan; Terry Cummiskey; Thomas Unander-Scharin (EUS); Dan Goldberg (EUS)
Subject: RE: Meeting with ERICSSON & Documentation of Action Items

Hi Peter,

Please find below some answers to your questions...

... The GSM1900 class 1 terminals can regulate the power level between 30 dBm and 0 dBm, in 2 dB steps. (Refer to GSM 05.05, paragraph 4.1.1). Assuming an average building penetration of 18 dB, the power may be reduced by 18 dB (average) as soon as the subscriber walks out of the building...

... Building attenuation was studied for the 1800 and 1900 MHz bands some years ago, and reports were published by ETSI, COST231 et.al. Some examples:
H.E. Walker, "Penetration of radio signals into buildings in the cellular radio environment", B.S.T.J Vol. 62, No. 9, 1983.
A.M.D. Turkmani, "Radio propagation into buildings at 1.8 GHz", COST231 TD(90) 117 Rev 1, 1991.
"Building penetration losses", COST231 TD(90) 116 Rev 1, 1991.
"Urban transition loss models for mobile radio in the 900- and 1800-MHz bands", COST231 TD(90) 119 Rev 2, 1991.
I.Kostanic, C.Hall, J.McCarthy, "Measurements of the Vehicle Penetration Characteristics at 800 MHz", Conference Proceeding, VTC 1998.
In GSM1900 link budget calculations Ericsson is generally applying an average building penetration maryin of 18 dB for dense urban and urban areas, and 12 dB for suburban areas...

Best regards, /Marc

Identifying and collecting Network Performance Measurements for In-Building Coverage

By: Luis Serranito

Director - Network Quality & Process Improvement

TELECEL
vodafone

Introduction

- Growth in mobile GSM Networks requires more agility in response to customer requests
- Quick automated identification of trouble spots.
- At high penetration levels, trend today is to increase the traffic per client .
- Expected growth in mobile data traffic.

Approaches for in-building coverage analysis

- **Traditional Method:**
  - **Visit each site and measure with TEMS or equivalent tool.**
    - **Time consuming.**
    - **Difficult to allocate resources**
- **Automated methods:**
  - **Usage of existing automated data collection methods.**
    - **Does not require additional resources**
  - **Other automatic data collection methods (Abis, stats. etc).**

TELECEL
vodafone

The impact of site characteristics on in-building propagation

- **Attenuation of different materials for the 900MHz band**

Material	**Attenuation (dB)**
Concrete • lron structured • 200 - 300 mm thick, with windows • Porous	 7 - 18 5 - 8 8
Brick	3 - 4
Plasterboard	1 - 2
Glass	1 - 2
Wood	1 - 6

*Reference **A**

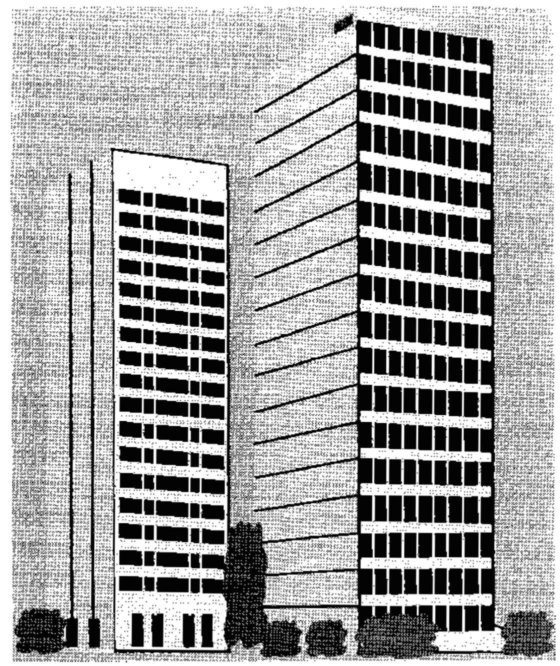
Global results of intensive tests on indoor penetration

- After a careful and detailed analysis of results, buildings were classified as:

– ***High***		– ***Isolated***
or	and	or
– ***Low***		– ***Integrated***

Testing Method and Explanation of Global Results

- Detailed analysis by a Lisbon University (IST) involved 15 buildings.
- Signal level on each floor was measured.
- CDFs for each floor were produced.
- Signal levels of all floors were summed to get a global CDF for each building.
- Categorization of buildings.



Global results

Buildings	Attenuation [dB]		
			Worst
H. Iso.	-7.1	8.0	16.9
L Is	11.0	23.0	22.0
H. In	10.5	23.5	25.0
L. Int.	12.7	23.2	24.1

Vehicles	Attenuation [dB]		
	50% Global	90% Global	50% Worst
Cars	4.3	10.8	7.6
Buses	0.2	6.2	1.7
Average	2.3	8.5	4.7

Can we Generalise These Results ?

Mobile phone considerations (2 Watt)

Minimum Signal Level Required indoor can be deduced from the following expression:

mSL= MAX(MSS;EN+S/N) + FM + BL - AG + IBa

- mSL ==> Minimum Signal Level required;
- MSS ==> Mobile Station Sensitivity;
- EN ==> Environment Noise;
- S/N ==> Signal to Noise Value;
- FM ==> Fading Margin;
- BL ==> Body Loss;
- AG ==> Antenna Gain;
- IBa ==> In-Building Attenuation

Mobile phone considerations (2 Watt)

mSL= MAX(-102;-101) + 9 + 7 - 0 + 20
= - 65 dBm

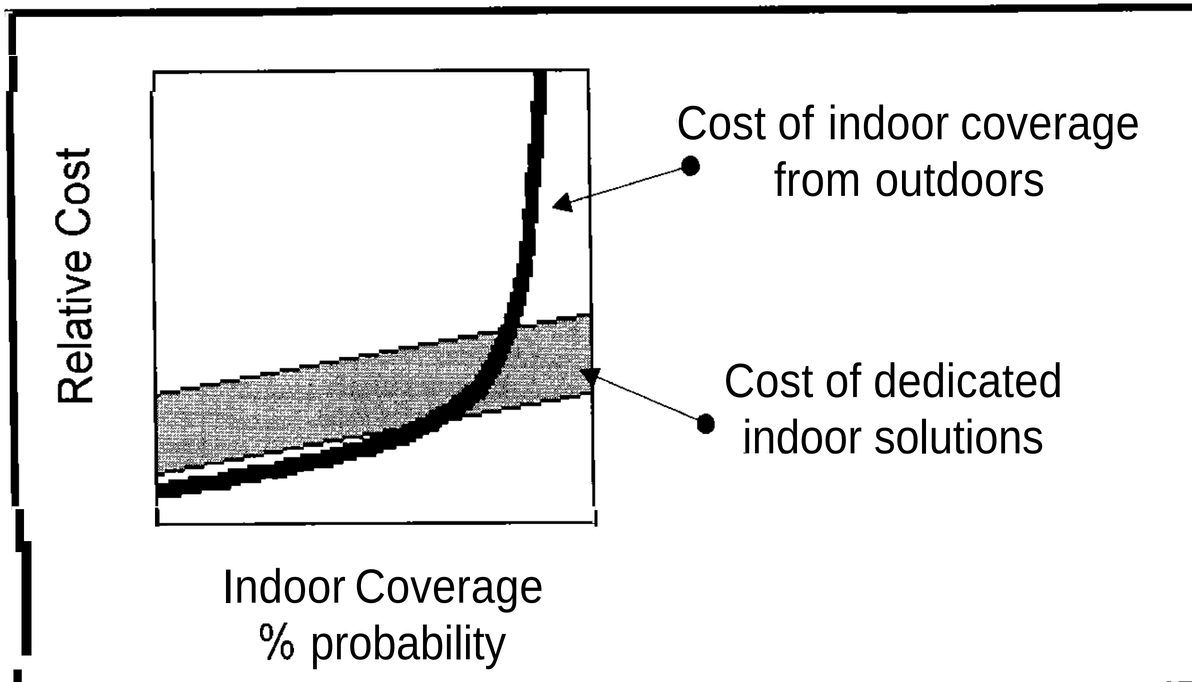
- Standard Values
- MSS=-102 dBm (2w mobile)
- S/N=9 dB (GSM specifications)
- AG= 0 dB (2w mobile)

Standard Values from Test Measurements

- FM= 9dB;
- EN= -110dBm;
- BL= 7 dB;
- IBa= 20dB (81% indoor coverage),
  25 dB (90% indoor coverage, 50% ground floor);

The economics of indoor coverage

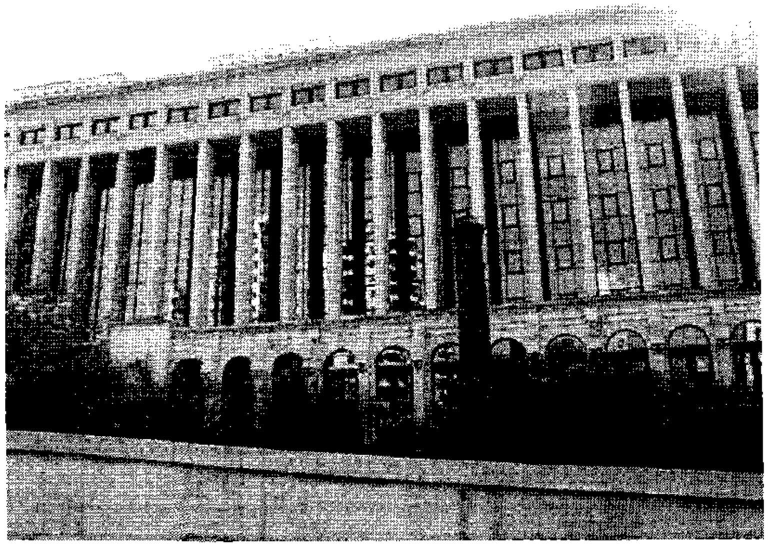
Previous studies indicate that the ideal point is around the 80% indoor coverage probability. What balance of costs is the Operator prepared to use ?



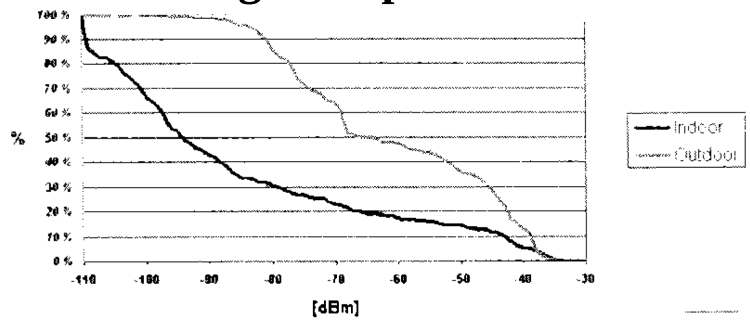
Field Test Measurements on worst case indoor scenarios

- Trials on 16 buildings public were performed.
- CDFs for both indoor and outdoor signal levels were plotted.
- Building attenuation - worst case analysis for public floors, typically lower levels.

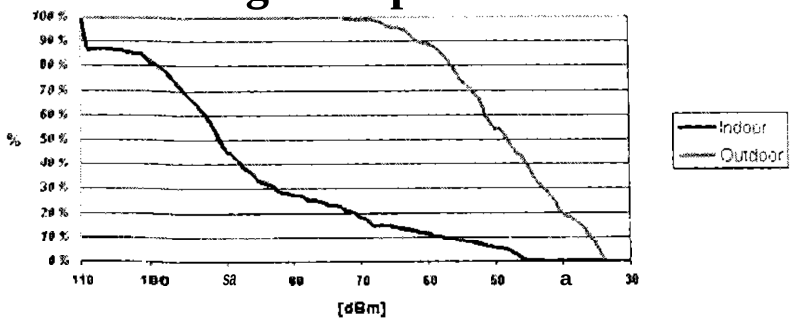
Field Trials - Case study 1



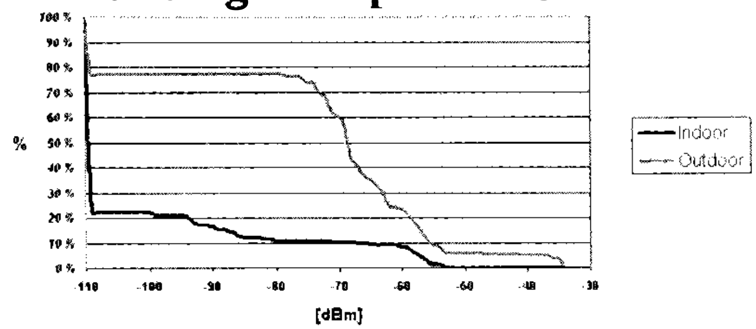
Building B - Operator 1



Building B - Operator 2

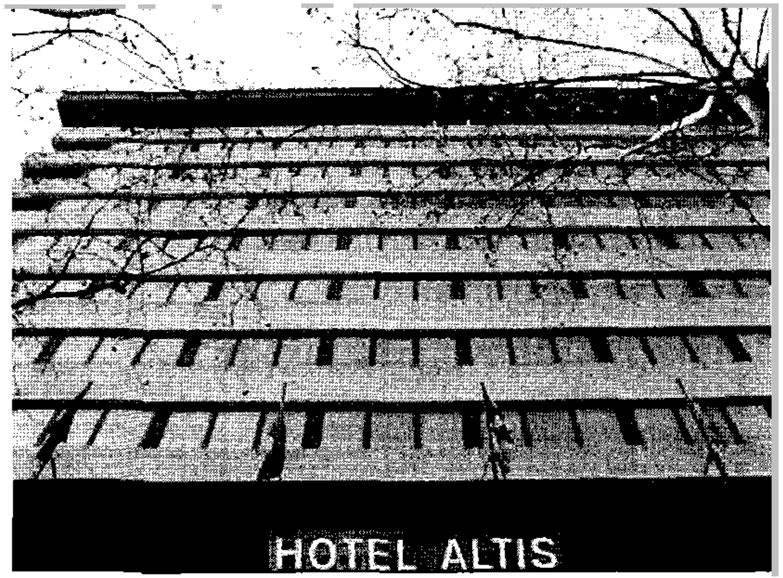


Building B - Operator 3

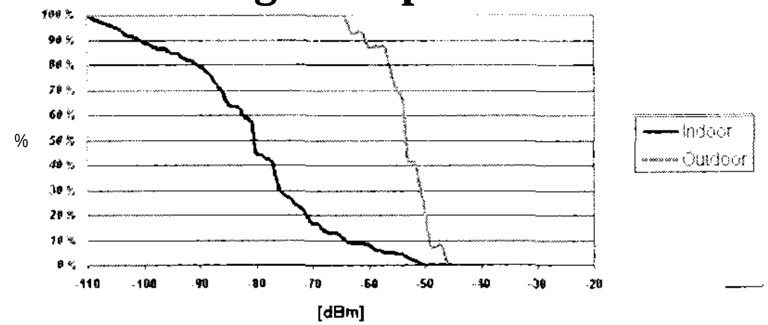


TELECEL vodafone

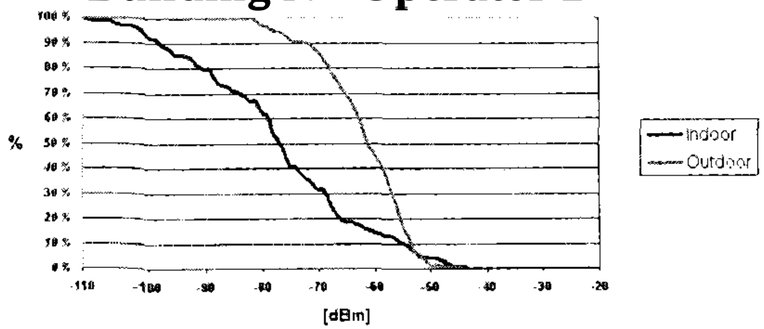
Field Trials - Case study 2



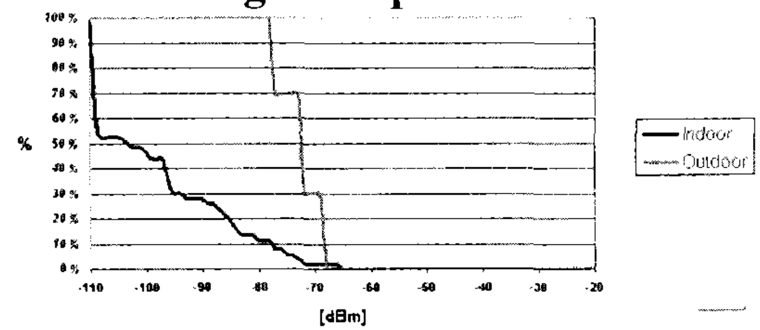
Building N - Operator 1



Building N - Operator 2

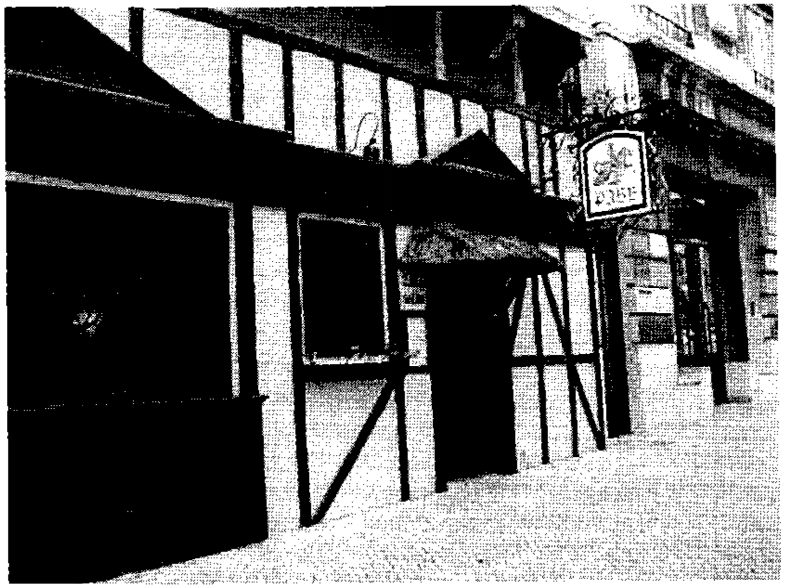


Building N - Operator 3

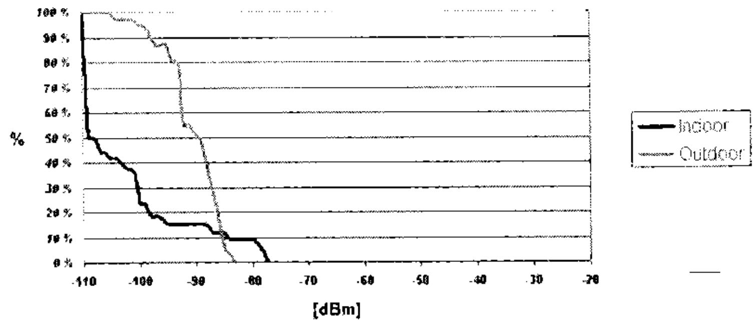


TELECEL vodafone

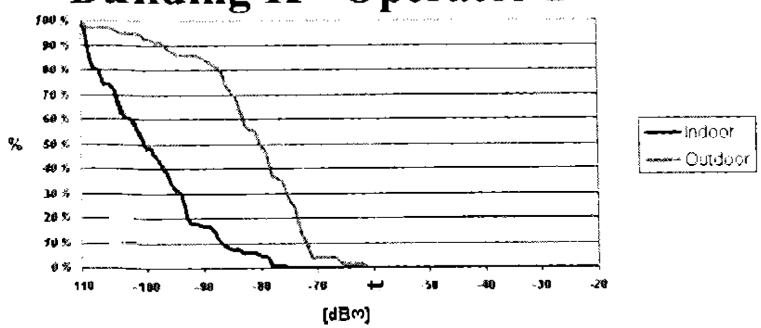
Field Trials - Case study 3



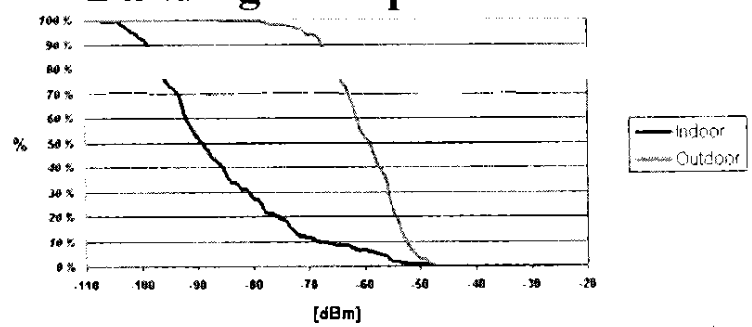
Building K - Operator 1



Building K - Operator 2



Building K - Operator 3



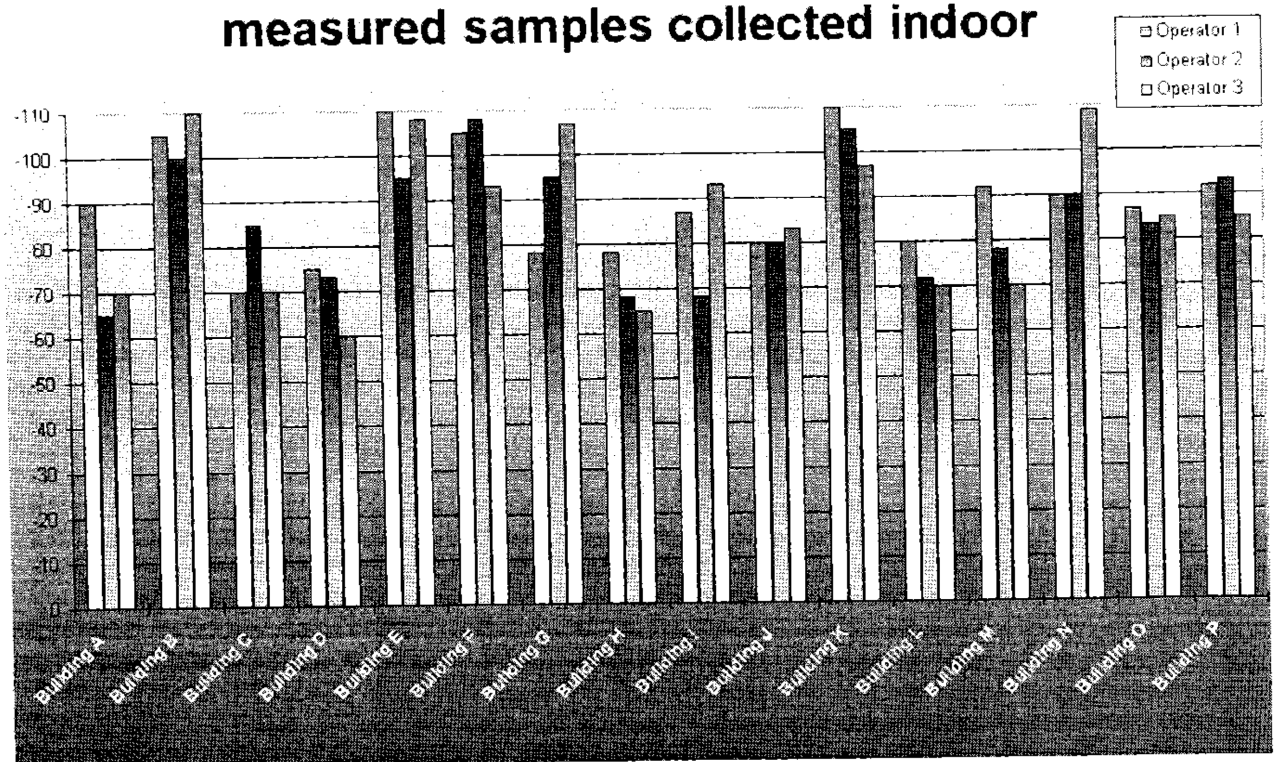
TELECEL vodafone

Summary of Results

The graph presents the indoor SS level at the 80% point of the respective CDF curve.

In general, all buildings where the outdoor street level signal strength exceeded -65dBm, there is an 80% probability level of indoor coverage.

Signal Strength values for 80% of the measured samples collected indoor



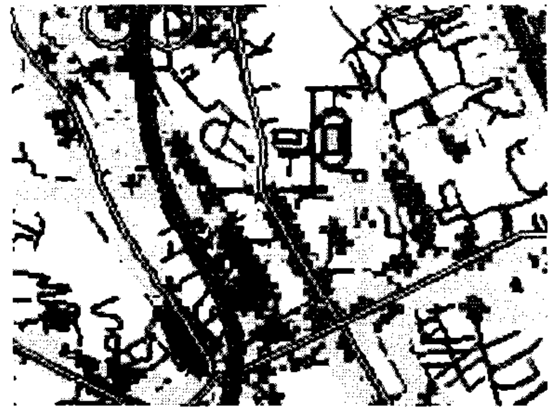
Using automated methods to confirm outdoor field strength

☼ Many operators today use benchmarking equipment to measure QoS and competitive analysis.

☼ This equipment collects information for their network and can provide “as is” data.

☼ Suitable post processing with a Geo-referencing tool can provide the information required for optimization.

☼ Alternatively, the planning tools can provide the information but may not be as accurate.



-65dBm plot

Areas in red will have a lower probability of indoor coverage

TELECEL
vodafone

Forecasting indoor Coverage Requirements

Differentiated shadings can be used for signal levels to aid in investment criteria.

Differentiated Signal levels

Delta map of Operator 1 vs 2

Delta Maps aid in determining competitive advantage on indoor coverage

CONCLUSIONS

- We can infer In-Building performance from the outdoor measurements.
- One can say that an additional **12** or **23** dB attenuation is experienced indoor for a probability of **50** or **90** % respectively, of in-building coverage.
- Clearly, if power is increased in order to provide indoor coverage (from outside), cars and buses will be covered as well.
- A new indoor coverage threshold IPHP of -65dbm is thus required outdoor for 81% probability of indoor coverage.

Thoughts for the future

- Maintain a continuous Optimization strategy.

- Adopt a consistent strategy for Antenna Types.

- Macro vs micro BTS strategy for resolving low signal strength outdoor.

- Strategy for reinforcing indoor coverage with special projects, especially in high rise buildings (even isolated).

- For a good match between cost and effectiveness, dependent on local constraints, use a Coverage Threshold IPHP, for levels above -65 dBm (81% probability of indoor coverage).

Acknowledgements:

A. R. Gahleitner, “Wave Propagation into Urban Buildings at 900 and 1800MHz” Project COST231, Internal report TD(93)092, Grimstad, Norway, May1993.

B. Network Development Group in Telecel

C. IST study for Telecel by Luis M.Correia and Ana Claro, Carlos Pardelinha, Francisco Gil, Jose Ferreira, Jose Queijo, Sandra Almeida

D. Paula Bruno, Nuno Magalhães & Domingos Morgado - Network Quulity Group in Telecel